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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/749,986	12/31/2003	Donald S. Gardner	42P18458	9962
8791	7590	12/14/2004		
BLAKELY SOKOLOFF TAYLOR & ZAFMAN 12400 WILSHIRE BOULEVARD SEVENTH FLOOR LOS ANGELES, CA 90025-1030			EXAMINER DUPUIS, DEREK L	
			ART UNIT 2883	PAPER NUMBER

DATE MAILED: 12/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/749,986

Applicant(s)

GARDNER ET AL.

Examiner

Derek L Dupuis

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) 12-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6, 8-10 and 21-23 is/are rejected.
- 7) ☒ Claim(s) 7, 11 and 24 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12/31/2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

## DETAILED ACTION

### *Election/Restrictions*

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-11 and 21-24, drawn to an apparatus, classified in class 385, subclass 42.
- II. Claims 12-20, drawn to a method of manufacturing an apparatus, classified in class 385, subclass 42.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions of Group II and Group I are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product could be made by forming the micro<sup>re</sup>sonator se<sup>o</sup>parat<sup>o</sup>ly and then disposing it on the silicon substrate as opposed to the claimed method of forming the microresonator directly on the substrate.

3. Because these inventions are distinct for the reasons given above and the search required for Group I is not required for Group II, restriction for examination purposes as indicated is proper.

4. During a telephone conversation with Kenneth J. Cool (Reg. No. 40,570) on 12/6/2004 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-11 and 21-24. Affirmation of this election must be made by applicant in replying to this Office action. Claims 12-20 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

JHG 12-13-04

### ***Specification***

5. The disclosure is objected to because of the following informalities: “the oxide maybe etched using either buffered oxide etch or by dry etching” in line 5 of paragraph 13 should apparently be “the oxide may be etched using either buffered oxide etching or by dry etching”. The phrase “around microresonator” in line 10 of paragraph 14 should apparently be “around the microresonator”. Also, the term “lasing” in line 10 of paragraph 14 appears to be an error. The phrase “making the ring being” in lines 13 and 14 of paragraph 15 is improper. The phrase “that waveguide” in line 6 of paragraph 16 should apparently be “that the waveguide”. The phrase “forming waveguide” in line 7 of paragraph 16 should apparently be “forming the waveguide”.

6. Appropriate correction is required.

### ***Claim Objections***

7. Claim 7 is objected to because of the following informalities: “includes silicon silicon-germanium nanocrystals” should apparently be “includes silicon or silicon-germanium nanocrystals”. Appropriate correction is required.

8. Claim 24 is objected to because of the following informalities: “microresonator is comprises” should apparently be “microresonator comprises”. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant

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for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

10. Claims 1-6, 8-10, 21, and 23, are rejected under 35 U.S.C. 102(e) as being anticipated by *Armani et al (US 2004/0179573 A1)*.
11. Regarding claims 1, 2, and 21, Armani et al teach an apparatus shown in figures 1, 4, 6, and 7. The apparatus includes a silicon substrate (120) (see paragraph 12). A microresonator (110) with an annular structure is disposed on the substrate (120) as shown in figure 1. The microresonator (110) is used to recirculate light at a desired wavelength (see paragraph 4). A waveguide (400) is disposed on the silicon substrate above the microresonator and light is coupled between the waveguide and the microresonator as shown in figures 4A and 4B (see paragraph 47).
12. Regarding claims 3 and 5, Armani et al teach an apparatus as discussed above in reference to claim 1. Armani et al teach that the annular structure can be a ring or a disk (see paragraph 26).
13. Regarding claim 4, Armani et al teach an apparatus as discussed above in reference to claim 1. Armani et al teach that the annular structure is a ring (see paragraph 26). Armani et al teach that the optical energy within the microresonator can be resonant in a whispering gallery mode (WGM) (see paragraph 12). By definition, a microresonator where the energy is resonant in a WGM is inherently has a circumference that is an integer multiple of the wavelength of the optical signal. The length from the center of the disk to the center of the waveguide forming the disk is, by definition, the radius of the disk. Therefore, radius of the disk is proportional (by  $2\pi$ ) to the

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circumference which is an integer multiple of the wavelength of the optical signals being resonated in the microresonator.

14. Regarding claim 6, Armani et al teach an apparatus as discussed above in reference to claim 1. Armani et al teach that the annular structure is a disk (see paragraph 26). Armani et al teach that the optical energy within the microresonator can be resonant in a whispering gallery mode (WGM) (see paragraph 12). By definition, a disc structured microresonator where the energy is resonant in a WGM inherently has a perimeter that is an integer multiple of the wavelength of the optical signal.

15. Regarding claims 8 and 9, Armani et al teach an apparatus as discussed above in reference to claim 1. Armani et al teach that the microresonator comprises a rare earth, specifically, erbium or ytterbium (see paragraph 14).

16. Regarding claims 10 and 23, Armani et al teach an apparatus as discussed above in reference to claims 1 and 21, respectively. Armani et al also teach the use of an optical pump to excite circulation of light in the microresonator (see paragraph 50).

***Claim Rejections - 35 USC § 103***

17. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

18. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Armani et al* (US 2004/0179573 A1).

19. Regarding claim 22, Armani et al teach an apparatus as discussed above in reference to claim 21. Armani et al teach that the distance between the waveguide and

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the microresonator is "in the order of hundreds of nanometers". This range includes the claimed range of being less than or equal to 250 nm. In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); In re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990). See MPEP 2144.05.

***Allowable Subject Matter***

20. Claims 7, 11, and 24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

21. The following is a statement of reasons for the indication of allowable subject matter:

22. Claims 7 and 24 are allowable over the prior art of record because the latter, either alone or in combination, does not disclose nor render obvious a microresonator including silicon nanocrystals or silicon-germanium nanocrystals in combination with the rest of the claimed limitations.

23. Claim 11 is allowable over the prior art of record because the latter, either alone or in combination, does not disclose nor render obvious an optical pump to excite circulation in a microresonator where the pump tunnels current through silicon dioxide to form electron-hole pairs in silicon nanocrystals or silicon-germanium nanocrystals that are in the silicon dioxide in combination with the rest of the claimed limitations.

***Conclusion***

24. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. *Gardner (US 2004/0183087 A1)* teaches a device that works as an

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optical pump with many of the limitations of claims 7, 11, and 24. *Bourlanoff et al (US 6,771,410 B1)* teach a device that works as an optical pump with many of the limitations of claims 7, 11, and 24. However, both of these references share a common inventor and assignee with the application; therefore, these references cannot be used as references under 35 U.S.C. 103(a) as they were filed within less than a year of the application's effective filing date.

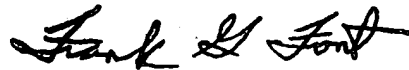
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Derek L Dupuis whose telephone number is (571) 272-3101. The examiner can normally be reached on Monday - Friday 8:30am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G. Font can be reached on (571) 272-2415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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